METHODS OF ENHANCING FINE PARTICLE DEWATERING

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Abstract

A new method of improving the process of dewatering fine particulate materials is disclosed. In this method, an aqueous slurry of fine particles is treated with appropriate hydrophobizing reagents so that the particulate material becomes moderately hydrophobic with its water contact angle considerably below 90°. A low hydrophile-lipophile balance (HLB) number surfactant is then added to the slurry, so that the surfactant molecules adsorb on the moderately hydrophobic surface primarily by hydrophobic attraction and, thereby, increase its contact angle close to or above 90°. By virtue of the greatly enhanced hydrophobicity, the water molecules adhering to the surface are destabilized and removed more readily by a mechanical dewatering process. Any nonionic surfactant with its HLB number below about 15 may be used for the hydrophobicity enhancement. The surfactants may be used in conjunction with appropriate solvents such as light hydrocarbon oils and short-chain alcohols. The moisture reduction can be further improved by using appropriate electrolytes in conjunction with the low HLB surfactants, spraying surface tension lowering reagents onto the filter cake, subjecting the cake to a suitable vibratory means, and by using combinations thereof.